

USE OF Remote sensing Techniques For Natural Disasters Monitoring and Management



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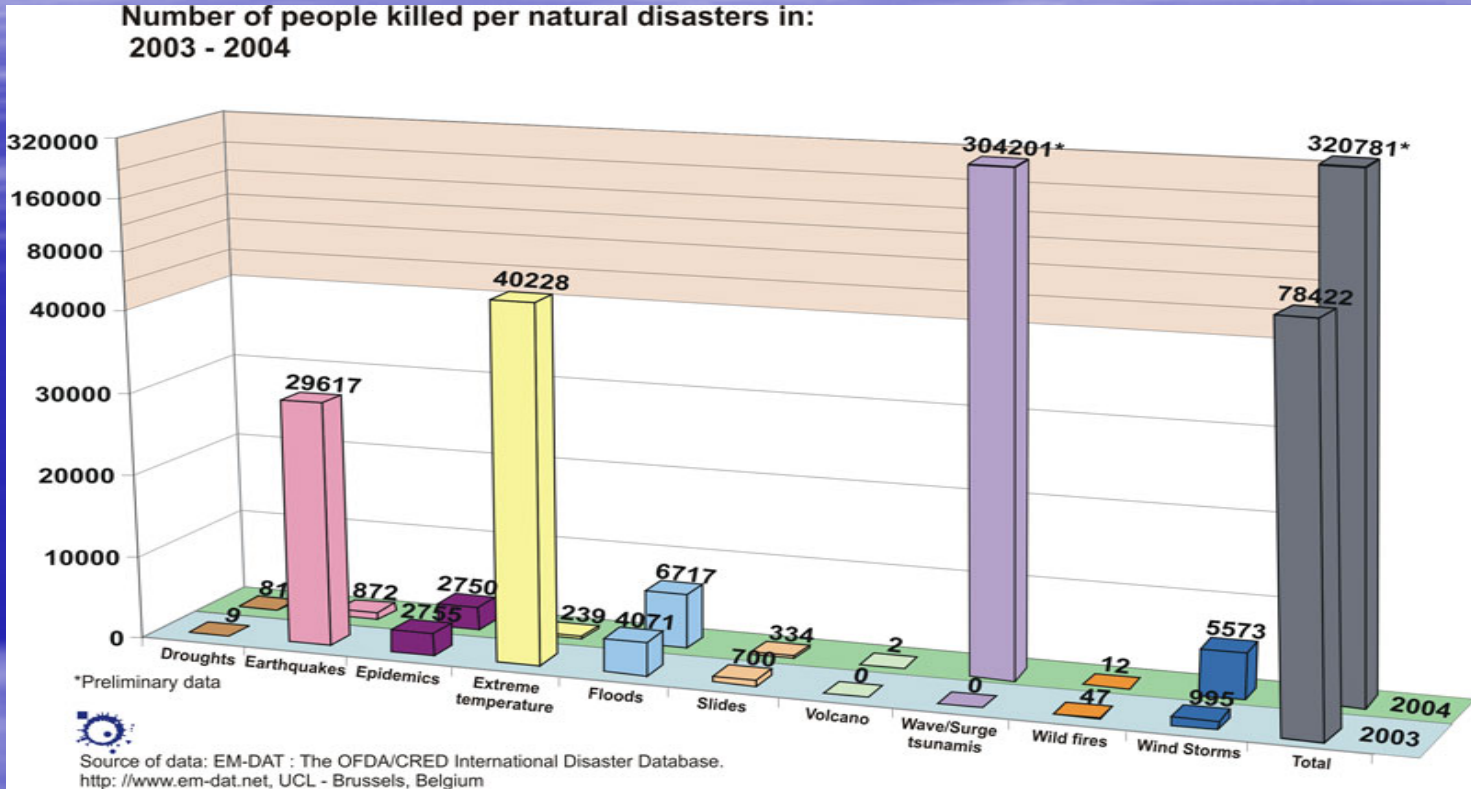
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The Natural Hazards

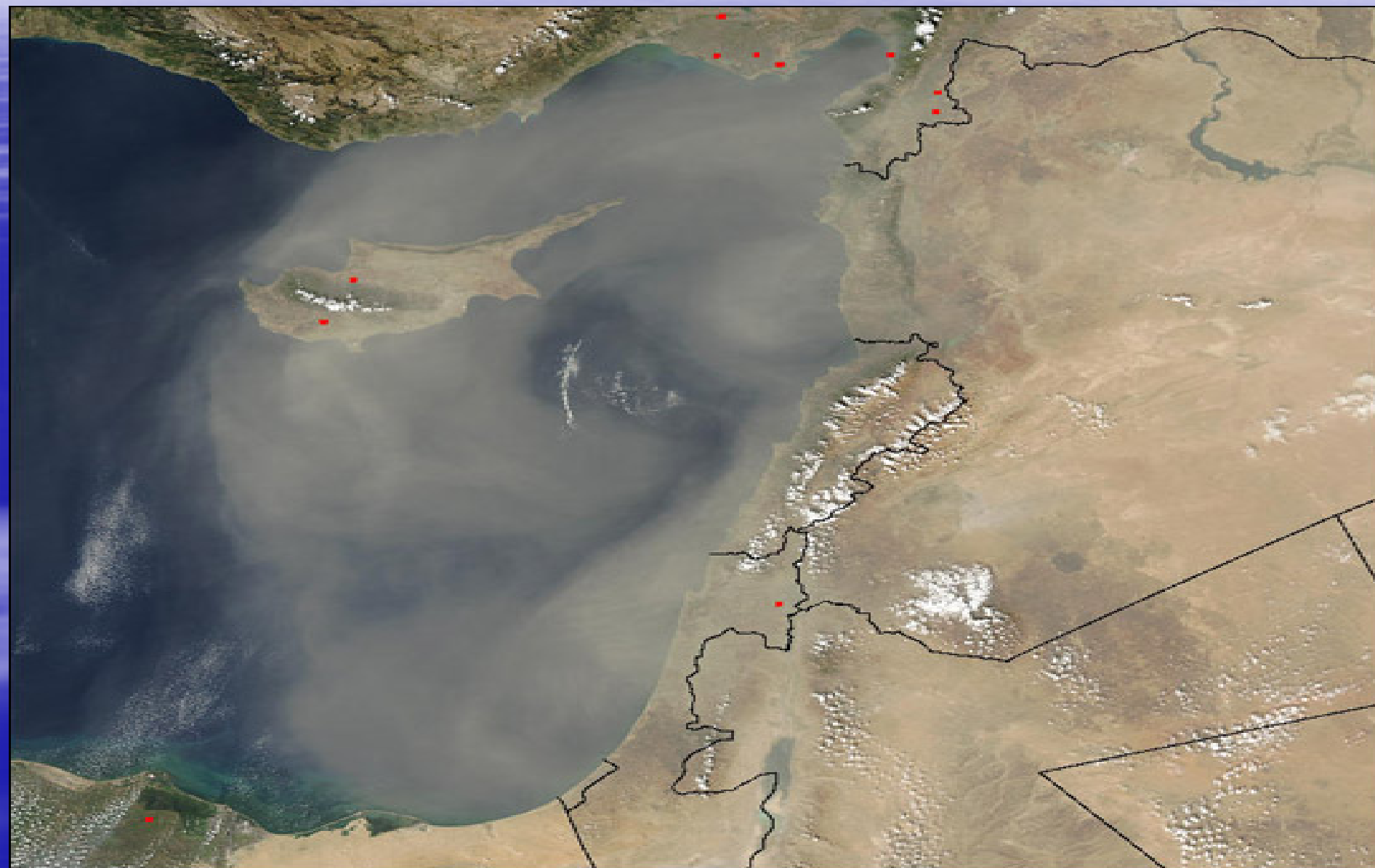


During the past four decades, natural hazards such as dust storms, sever storms and tropical cyclones, droughts, floods, earthquakes, wild-land fires, and volcanic eruptions, oil spills have caused major loss of human lives and livelihoods, the destruction of economic and social infrastructure, as well as environmental damages. Economic losses have increased almost ten times.



91.900 people killed in 2005

Dust Storms & Air pollution



Dust Storms & Air pollution



Drought and Desertification



Desertification monitoring includes activities which are part of the integrated development of the degraded land which are aimed at:

- **Assessment of current states of desertification.**
- **Analyses of land degradation process.**
- **Selection of basic indications of desertification.**
- **Mapping of degraded land and other related natural resources.**
- **Evaluating the impact of land use change and implemented rehabilitation measures.**
- **Desertification monitoring can be done using technology.**
- **Some examples on desertification monitoring is as follows:**

Drought of Soil



Drought and Desertification

Soil water erosion

Soil wind erosion

Soil salinization

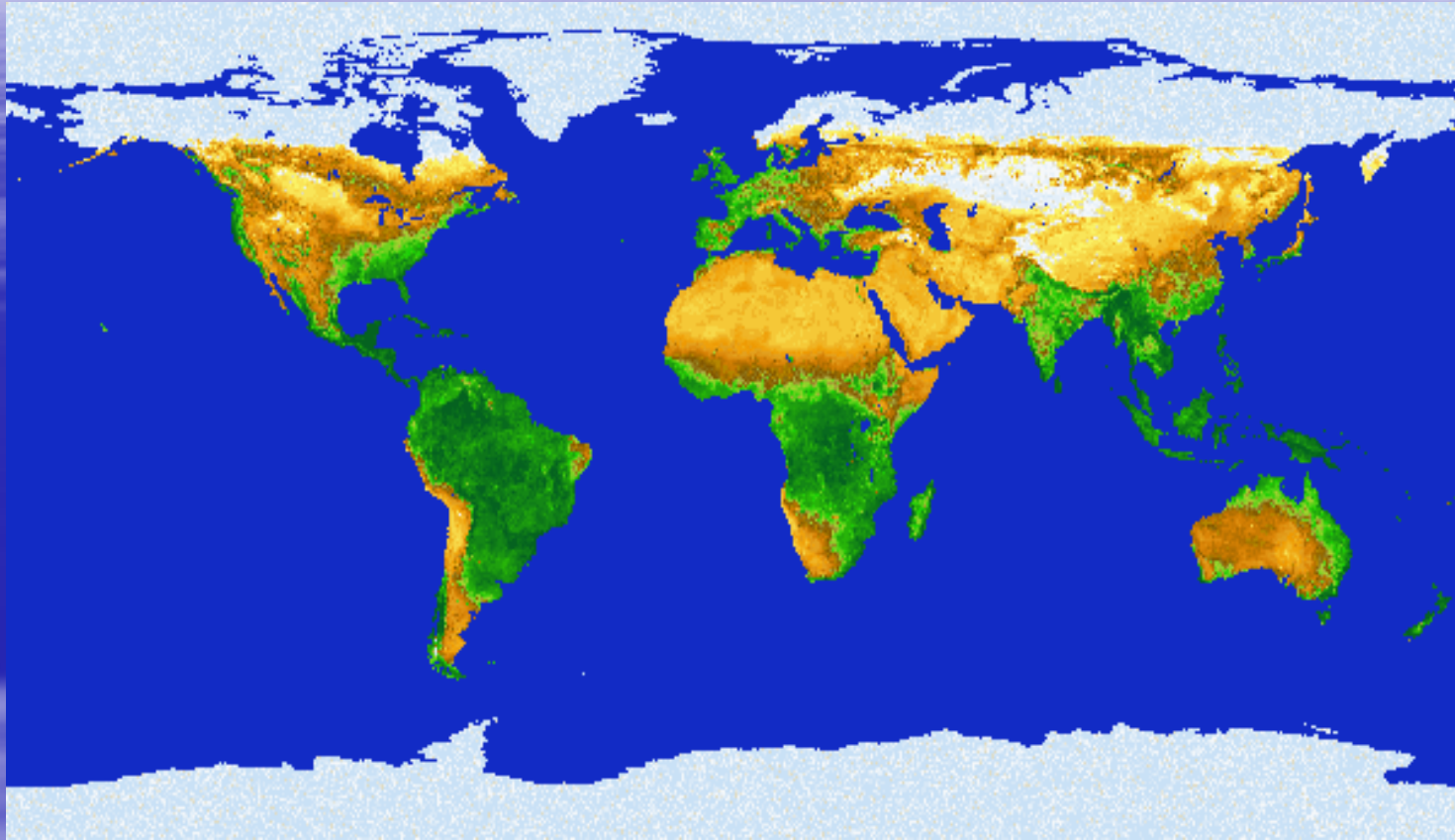
Rangeland monitoring

Drought and Desertification



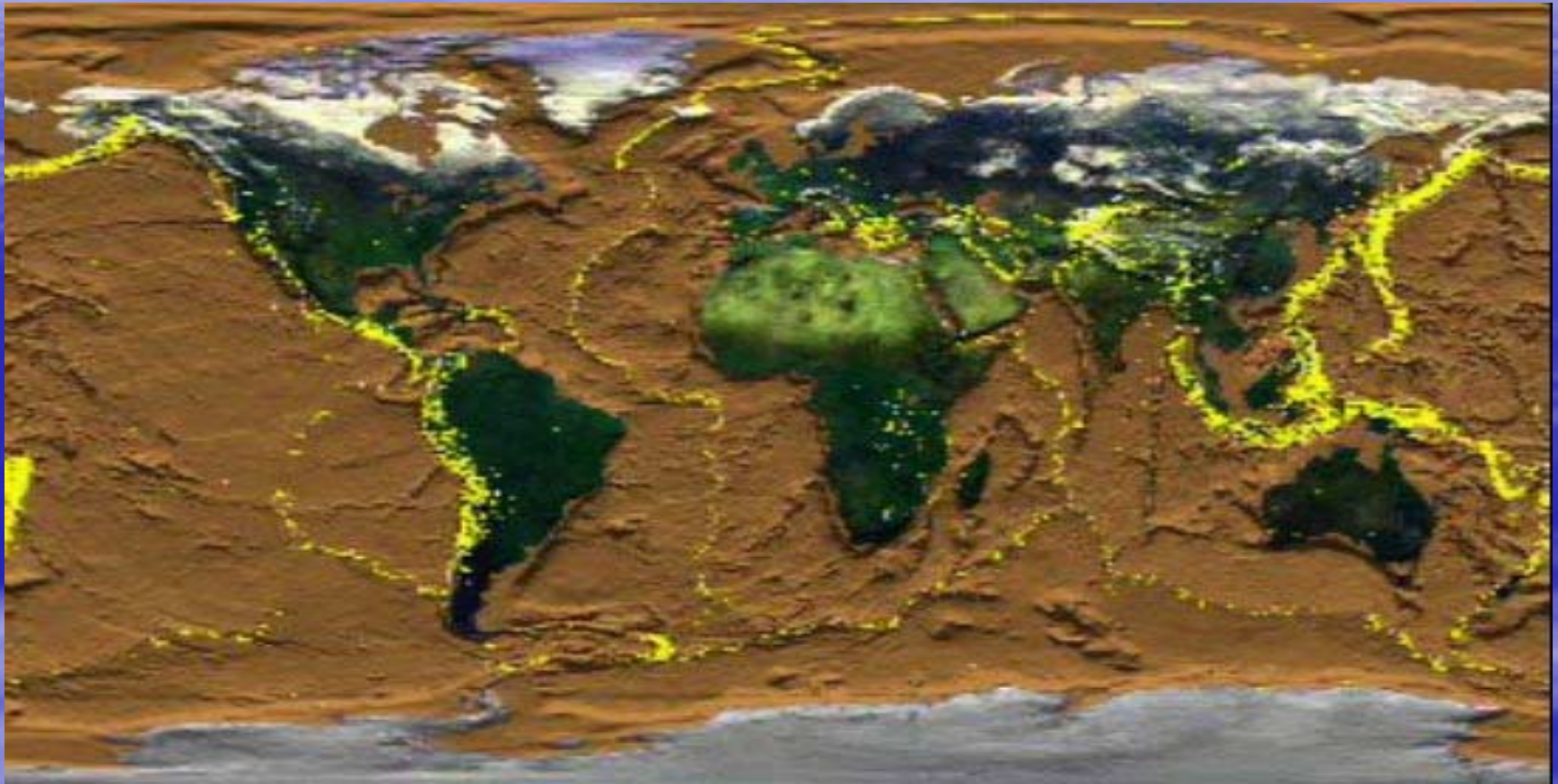
- *The following is the recommended methodology to monitor desertification process using remote sensing techniques:*
- *Regional monitoring using low spatial resolution and high temporal resolution remotely sensed data, where the effected area can be highlighted.*
- *Identifying high special resolution remotely sensed data to monitor the affected areas.*
- *Digital processing of remotely sensed data such as geometric and radiometric correction enhancement classification and other related processing.*
- *Images preparation at suitable scales and format such as (FCC, NDVI).*
- *Visual images interpretation using different analytic factors, such as color, ton, pattern, location and stereoscopic vision if possible.*
- *Primary thematic maps preparation, which includes soil, vegetation cover, land use. Land units and land degradation maps.*
- *Field check and field verification of the prepared maps as well as field data and samples collection.*
- *Correction of the thematic maps and preparation of the final maps and reports*

Drought and Desertification



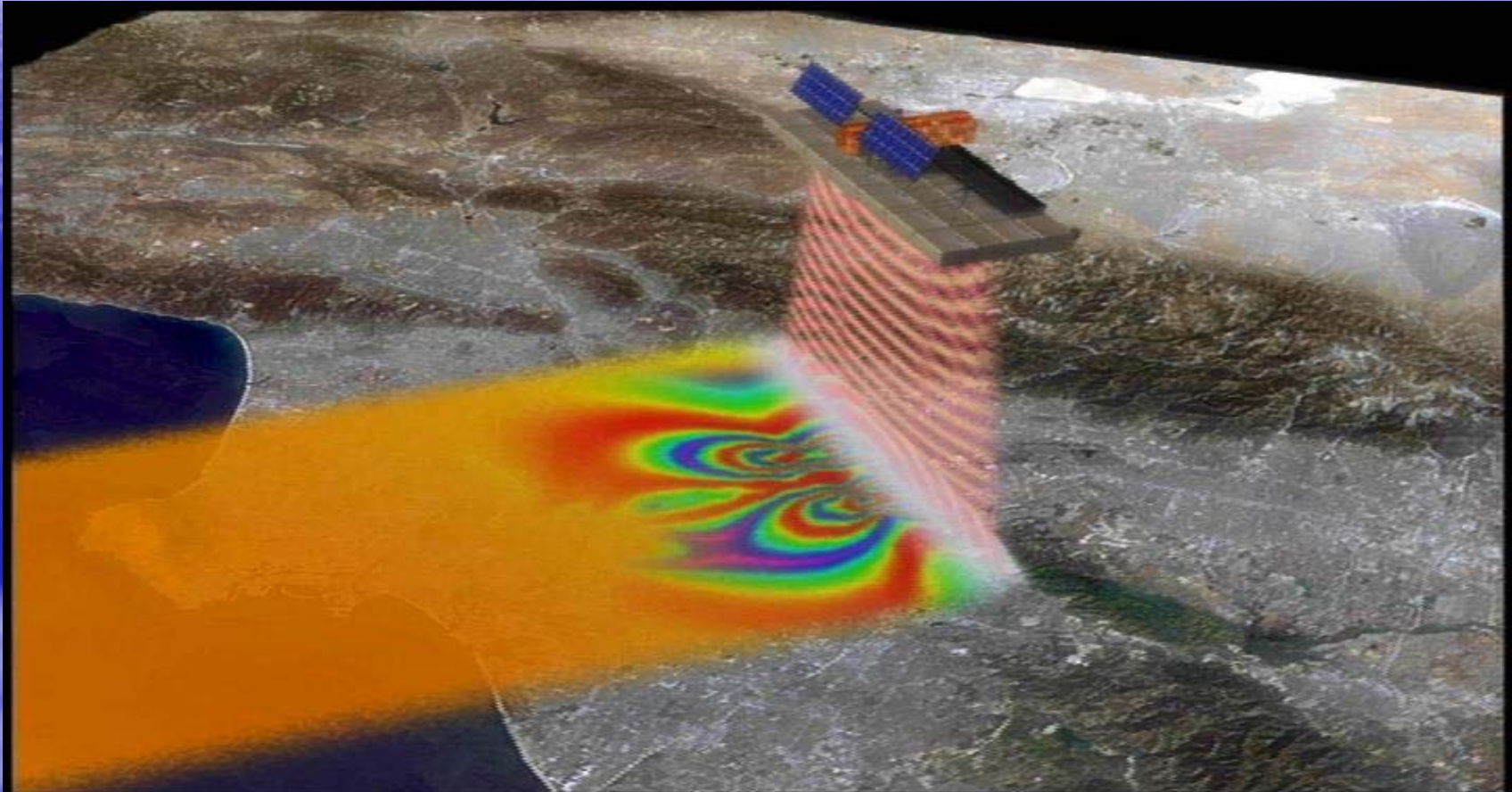
Vegetation Cover Index in the World

Earthquakes



World Earthquake Zone

Earthquakes



Predicting the Earthquake by Radar Satellite

Earthquakes







Fig (5)

Tectonic scheme for arabic rift sestem by interprelation space images
And epicenters earthquakes which had happend 1910 - 1993 .

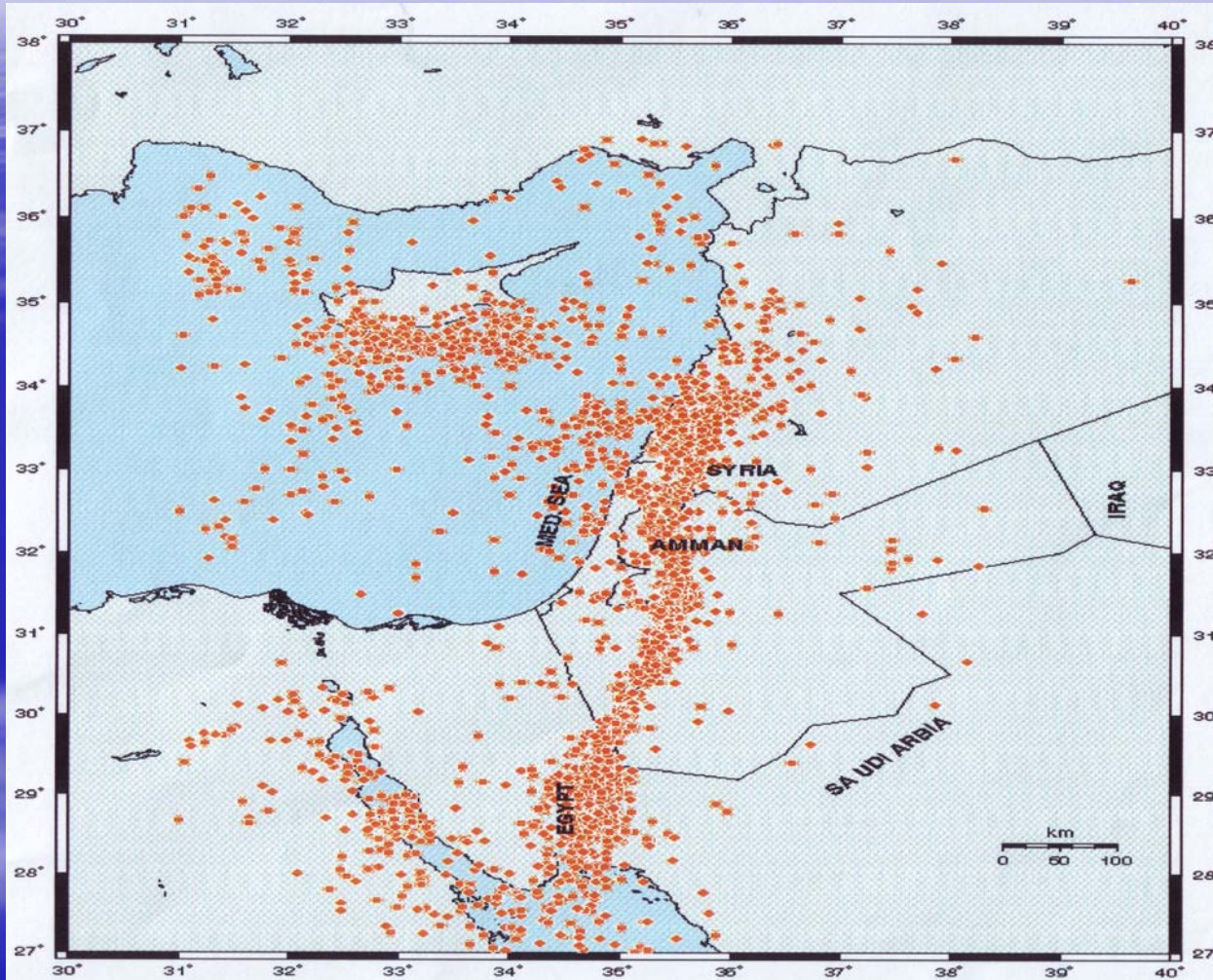
by :

0 5 10 15 KM

Dr.Eng.mohamad Rukieh 1995 .

- Legend 1-  Rift faults . 2-  Linamets and faults .
- 3-  Ring structures. 4-  Weak, med. and strong earth
quakes .

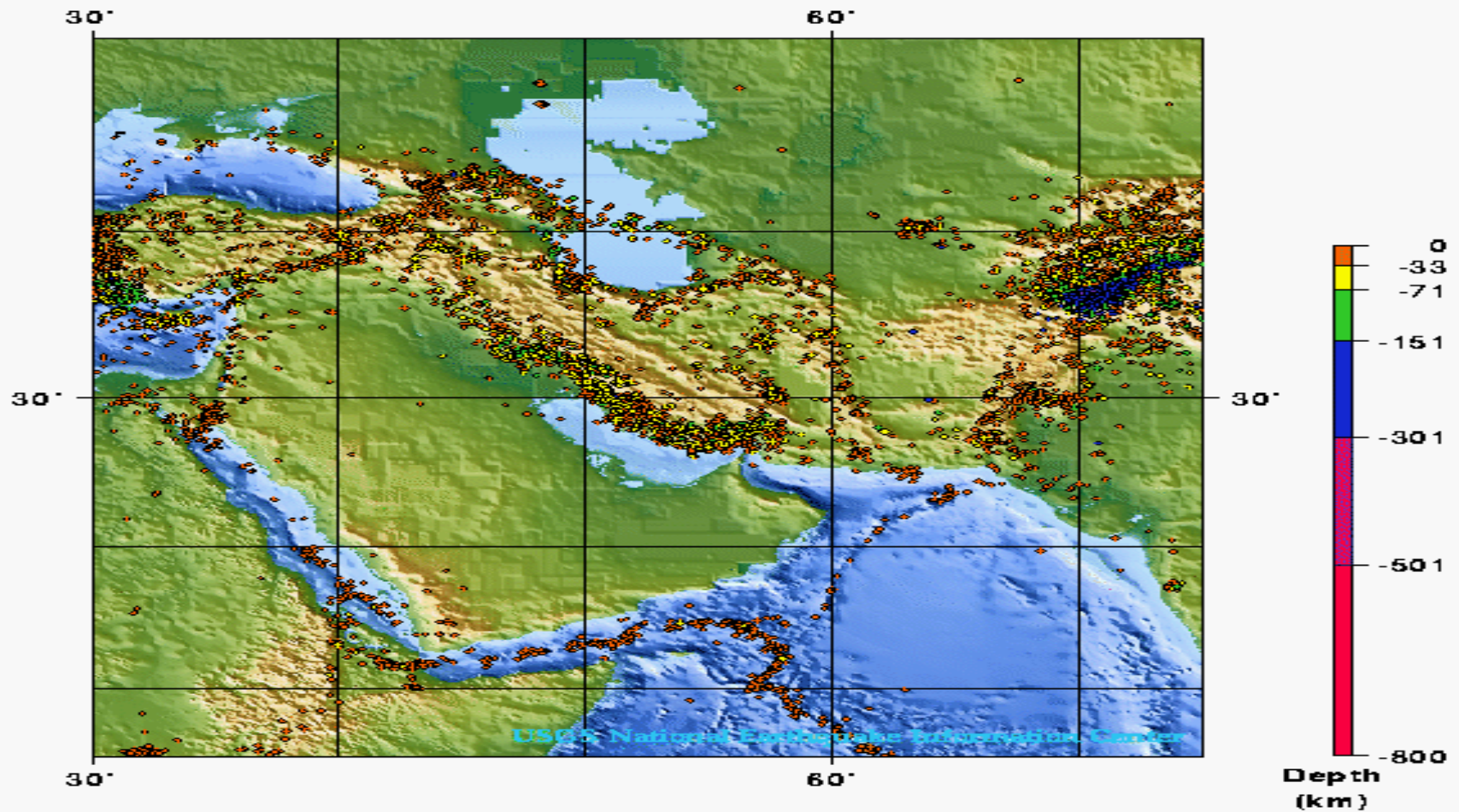
Earthquakes



Earthquakes in Arabic Rift System between 1995-2005

Earthquakes in M.E.

Seismicity of the Middle East: 1975 - 1995

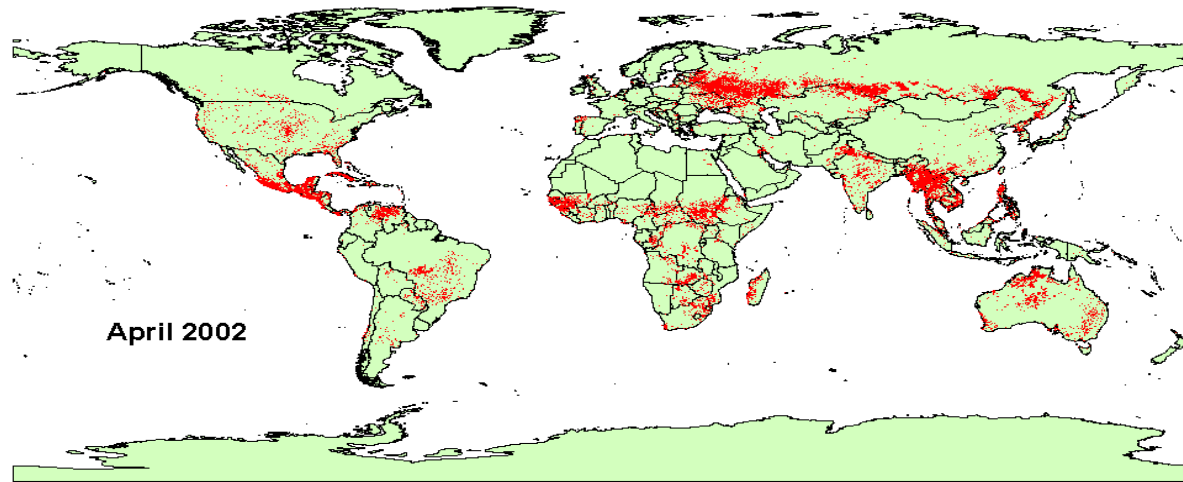


Earthquake in city of Baniyas, Syria in 29 March 2006 M. 4,6



Forest Fires

MODIS Land Rapid Response Fire Detections

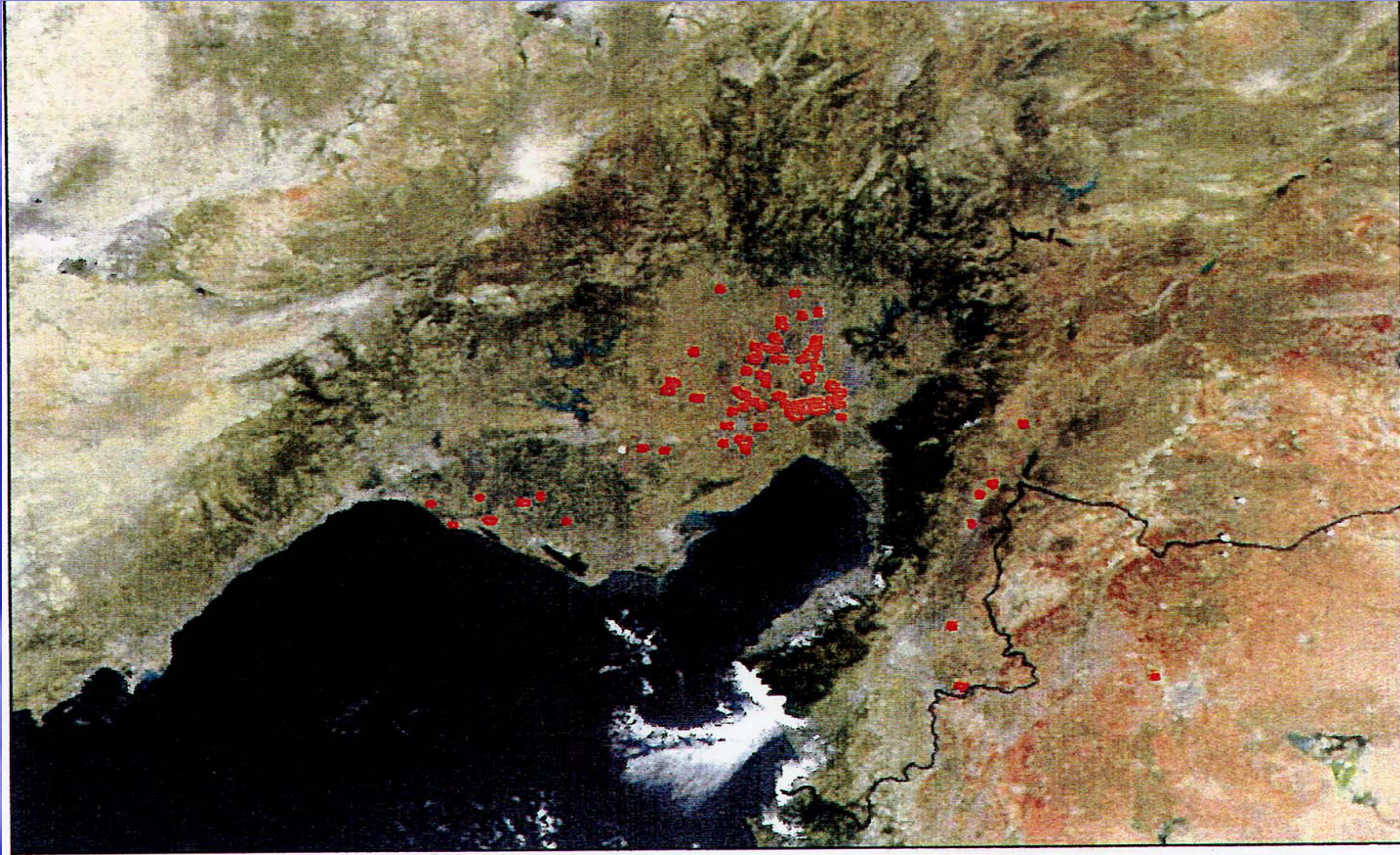


Legend

- MODIS Fire Detections from the Terra Satellite
- World Countries

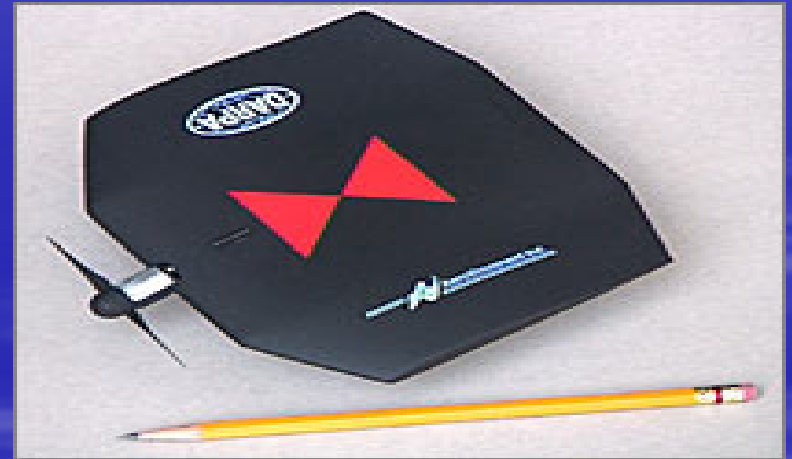
Animation of the forest fire

Forest Fires



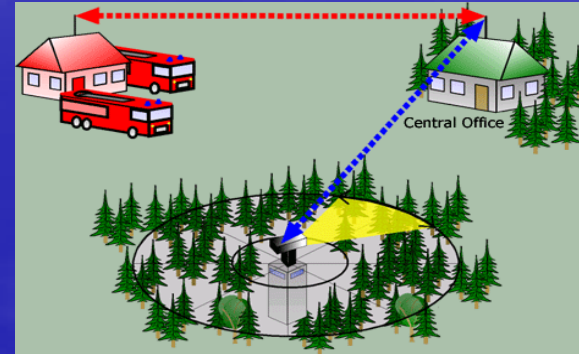
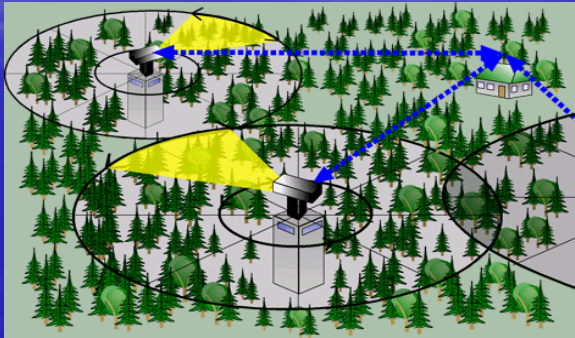
**Space Images of the forest fires in South Turkey
and North West of Syria**

Forest Fires



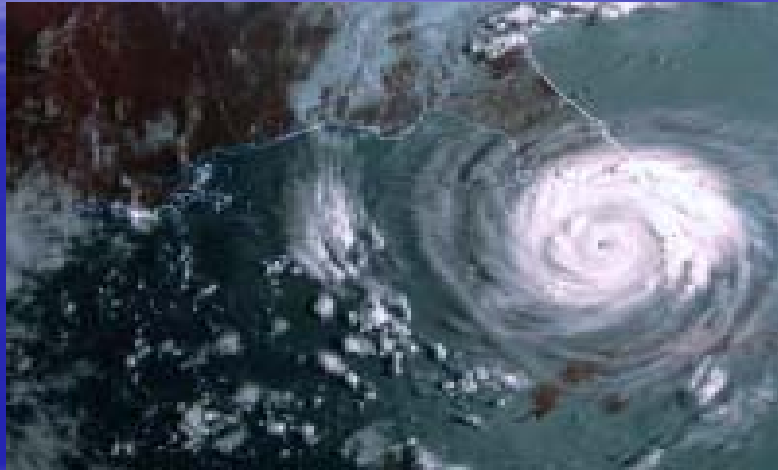
Unmanned Aviation Vehicles

Forest Fires

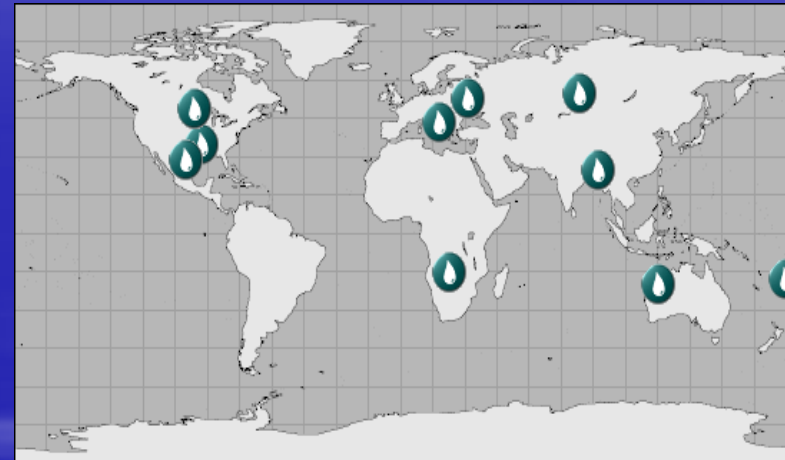


Using Telemetry Camera as Early Warning of
the Forest Fires

Floods and Severe Storms



Space Image of Cyclones

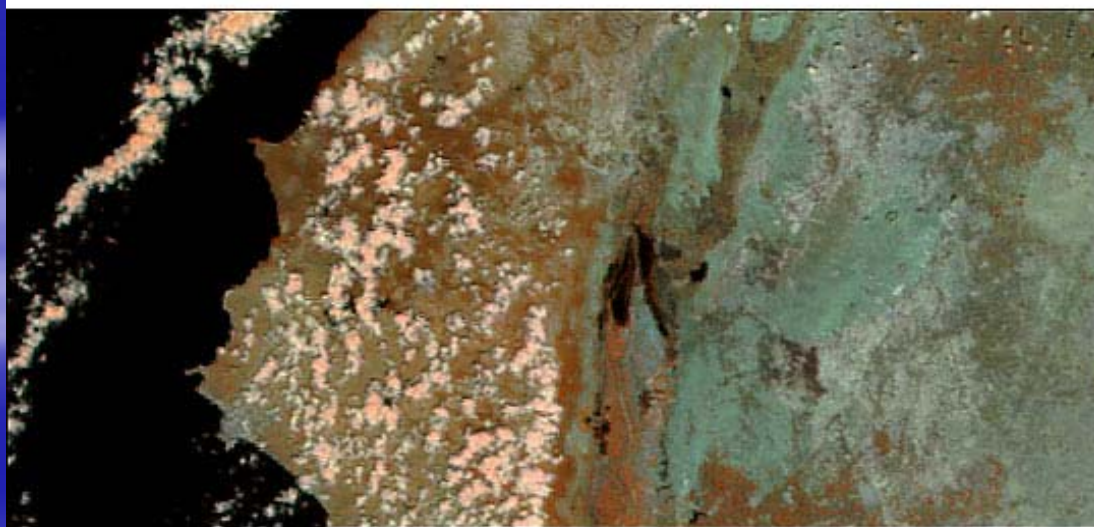


Locations of Cyclones in the World

Floods and Severe Storms



June 3, 2002



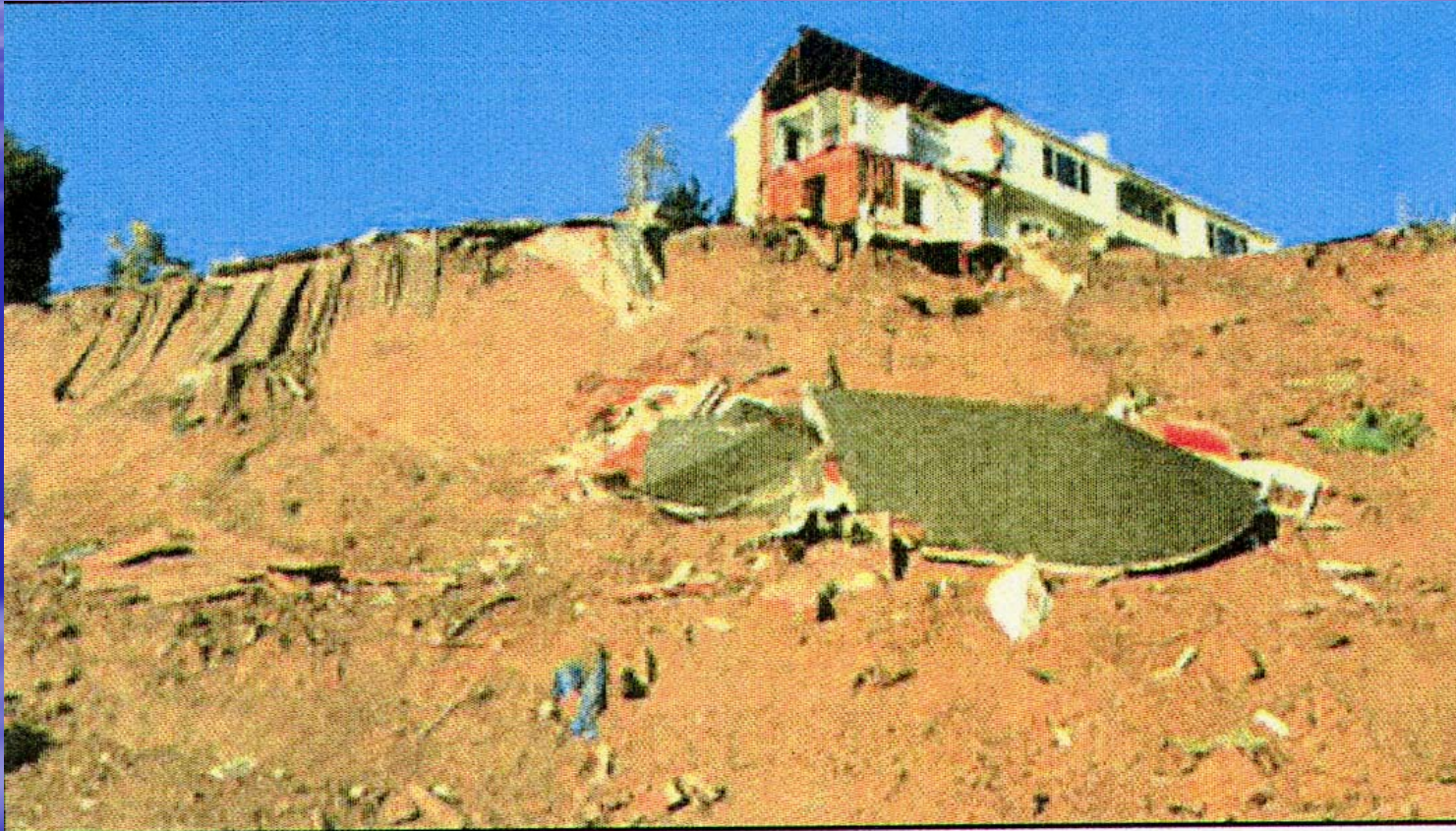
June 5, 2002

Scale (km)



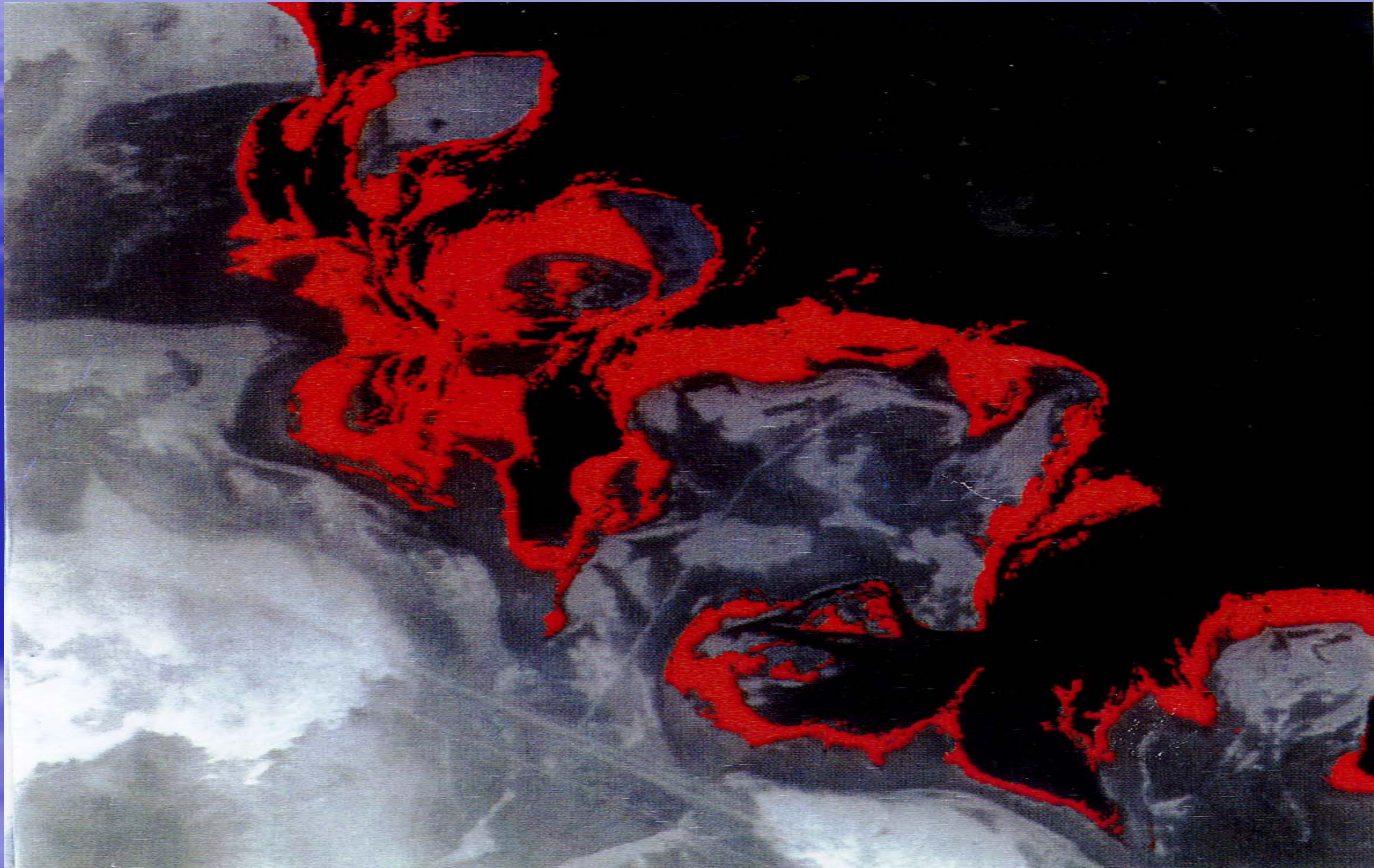
Terra Space Image
of Dam Break in
Syria

Landslides



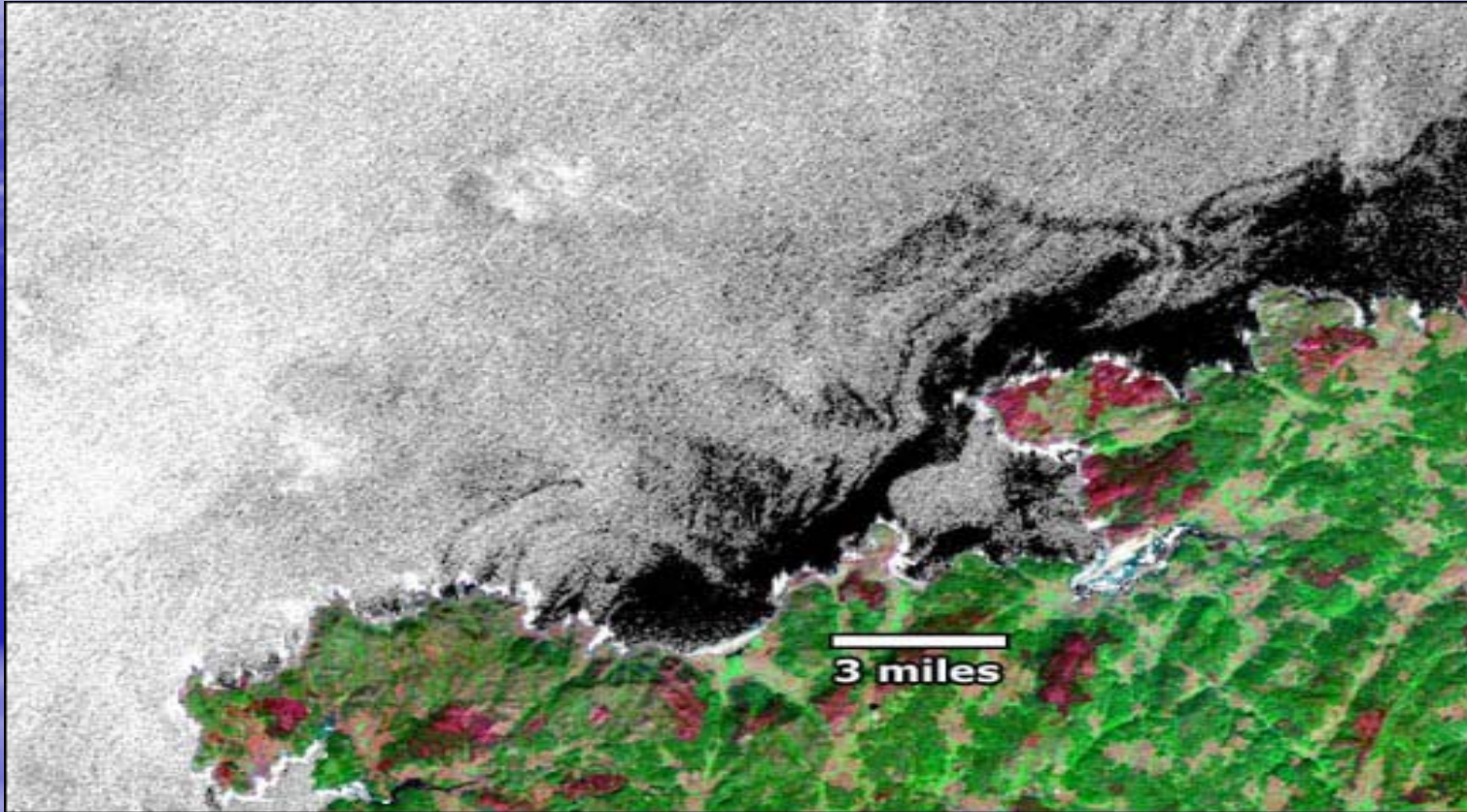
Example of landslides

Oil Spills



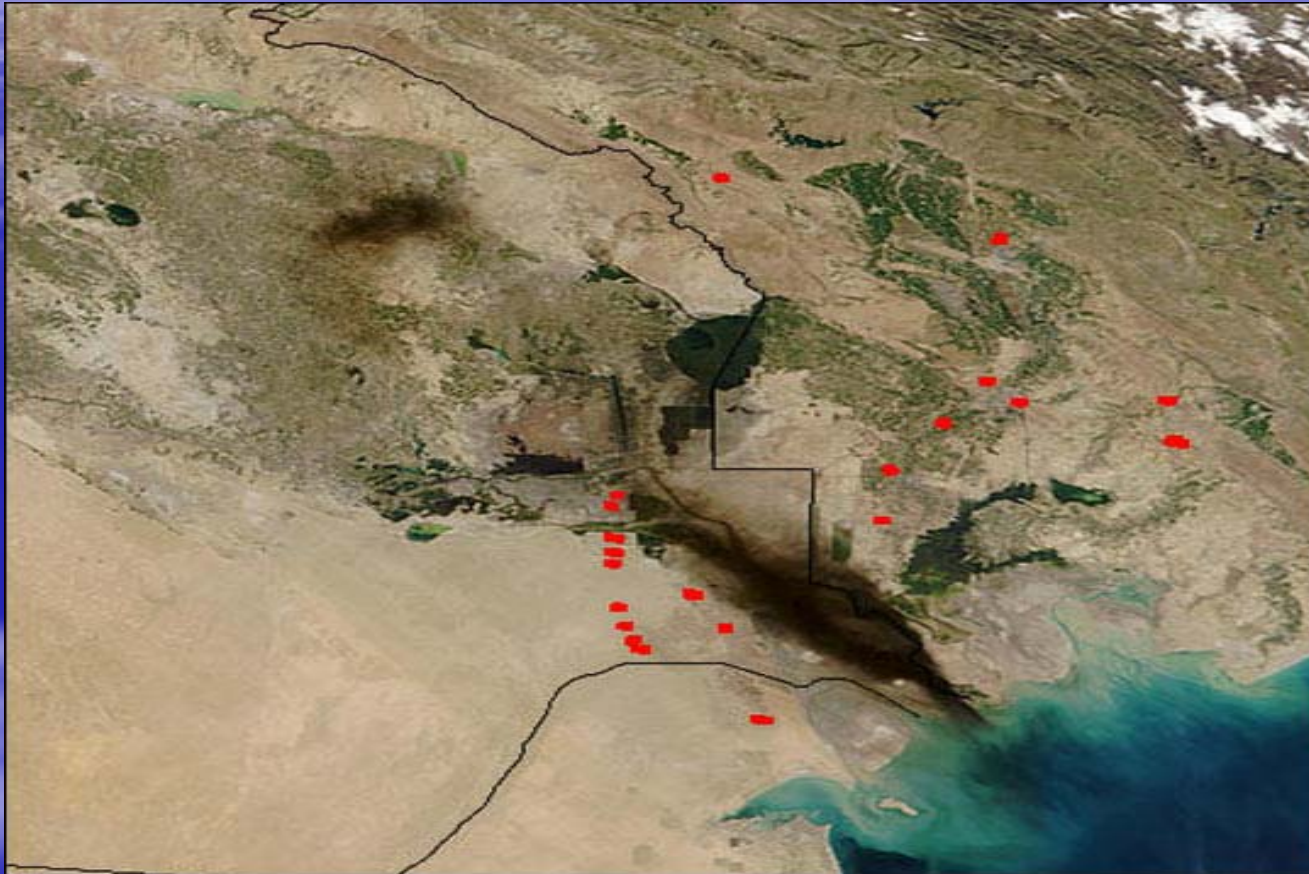
Spot Space Image of Oil Spill in Arabic Gulf

Oil Spills



Space Image of Oil Spill in Spanish Coast

Fires in pipelines



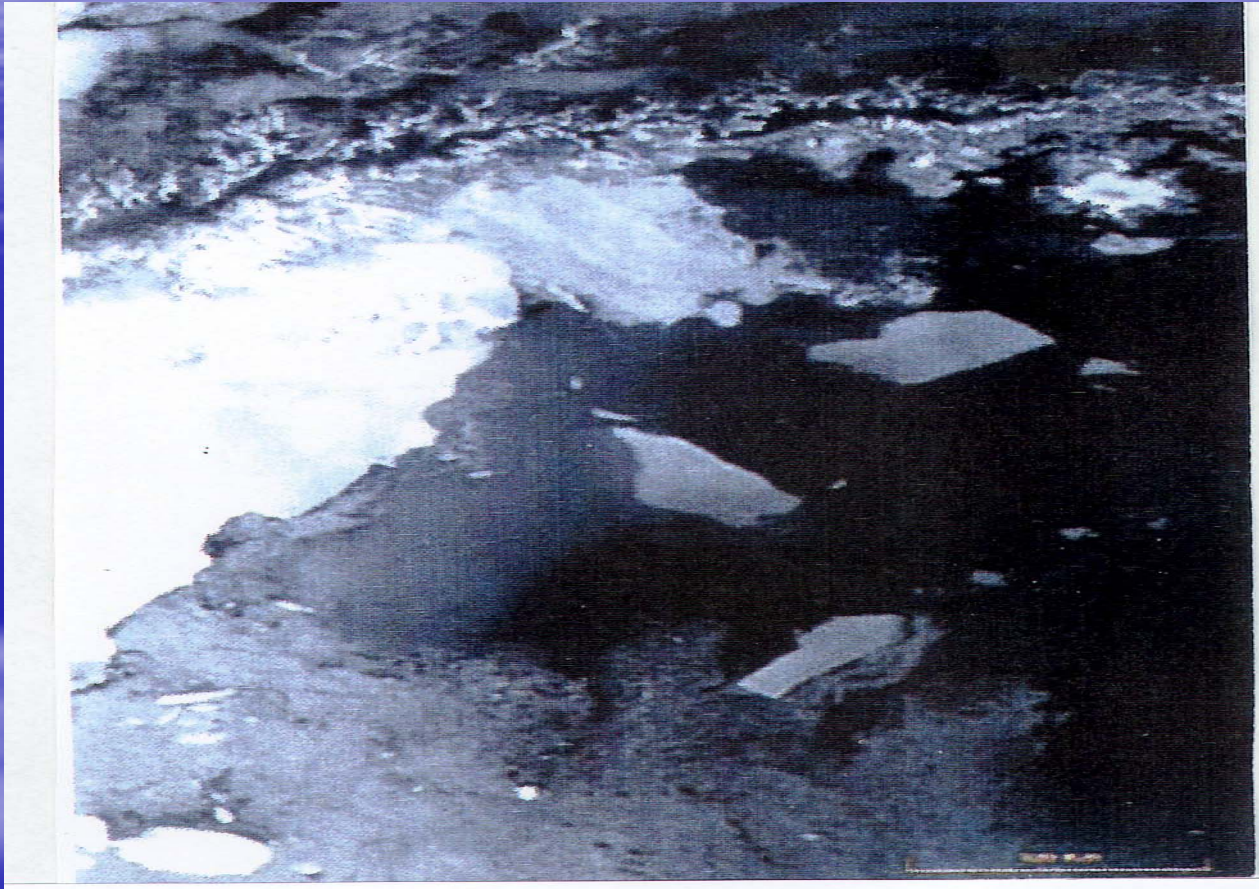
Fires in Oil Wells in Gulf

Volcanic Eruptions



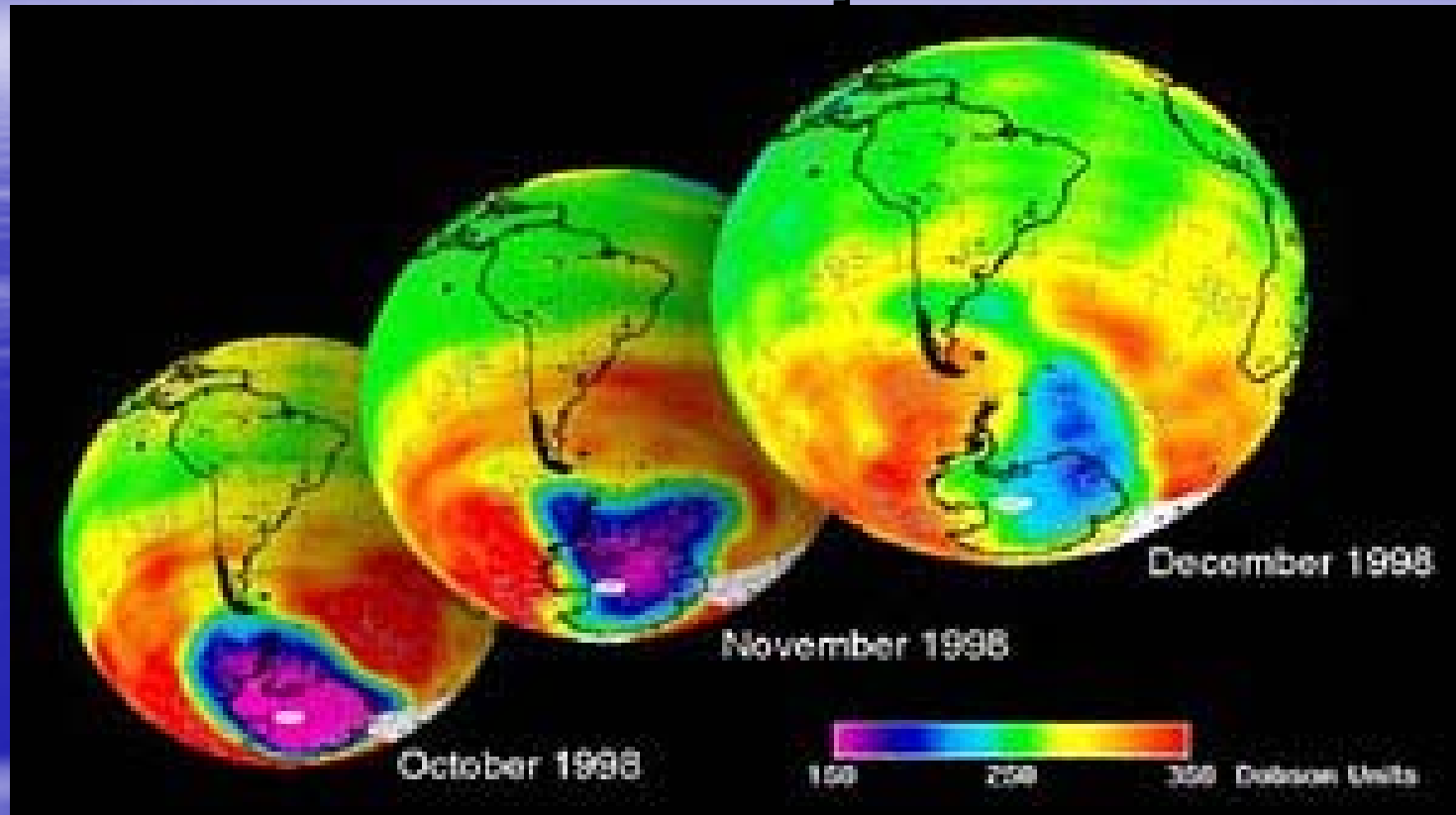
Terra Space Image of the Smoke Plume from Mount Etna, Italy

Ice Hazard



An Envisat Space Image of Ice Sheets in Antarctica

Ozone Depletion



An ERS-2 Space Image of Ozone Holes

Orbiting scientific instruments look at the limb to measure how the concentrations of trace gasses vary with altitude and monitoring of the Ozone hole. The Ozone hole can be detected by using NIMBUS-7, ERS-2 (GOME) and space shuttle (SOLSE-2).

Sun Flairs



Sun Flairs

Natural Disaster & Environment Management using Remote Sensing Techniques



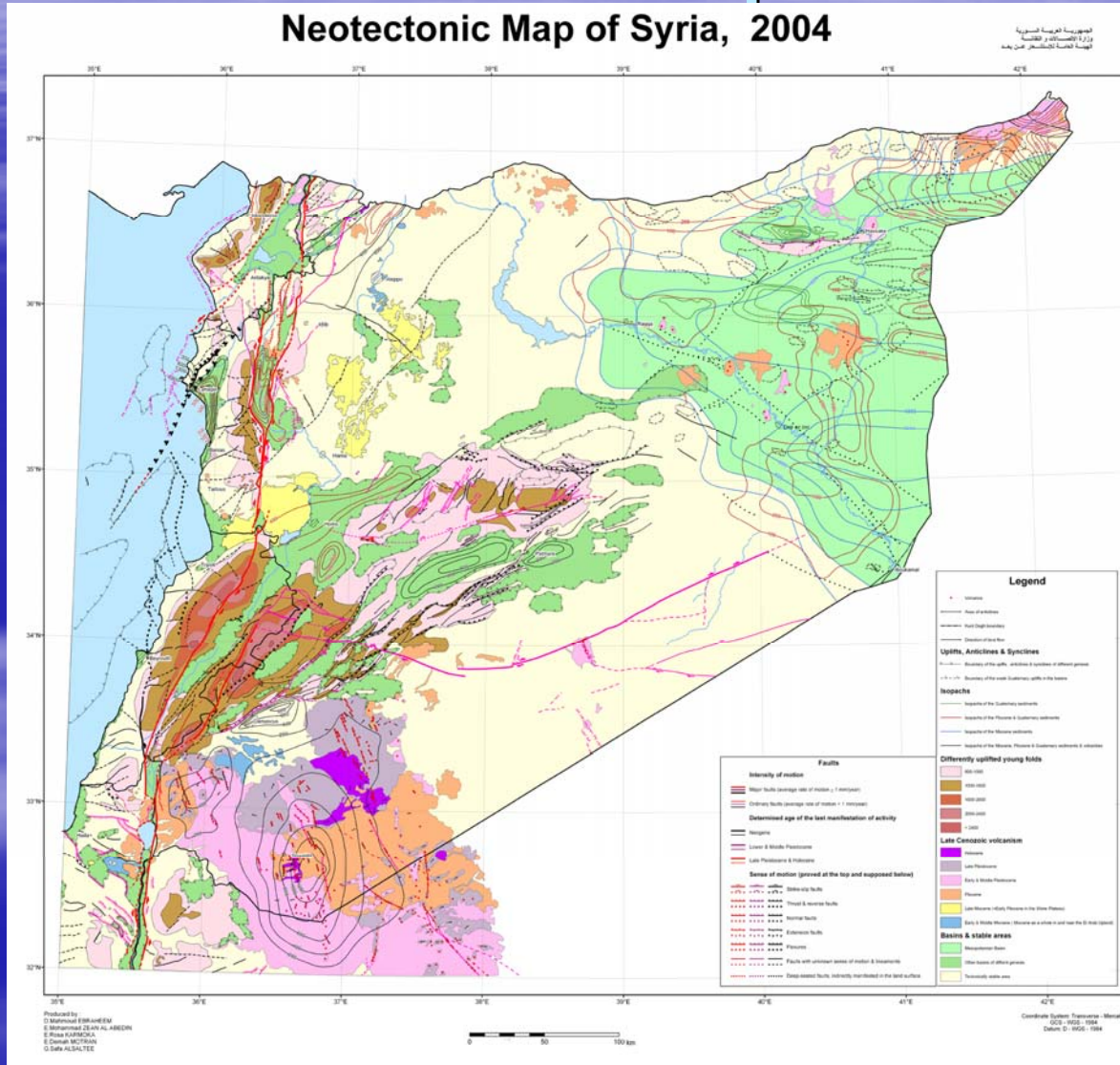
Adoption of the following specific recommendations would considerably enhance the utility of Earth Observation Space Technology for Disaster and Environment Risk management

- 1- Preparing the new tectonic maps using remote sensing data GIS and GPS

Natural Disaster & Environment Management using Remote Sensing Techniques



Neotectonic Map of Syria, 2004



Natural Disaster & Environment Management using Remote Sensing Techniques



- 2- Compile base-maps of high risk areas
- 3- Continue investigation into areas of earthquake forecasting research.
- 4- Support diversity of very high resolution images
- 5- Bring very high resolution images to facilitate damage assessment
- 6- Importance of the benefit of Variety of spatial and temporal information from different sources

Natural Disaster & Environment Management using Remote Sensing Techniques



- 7- Use information for all the organizations working in the field of disaster management.**
- 8 Using the media (Radio, TV, Newspapers, Internet) for capacity building**
- 9- Preparing the virtual flights over the risk areas by using the space data**
- 10- Support of the involvement of non-governmental organization and local population in disaster reduction**
- 11- Establishing national Organization for the disaster management**

Natural Disaster & Environment Management using Remote Sensing Techniques



- 12- Establishing ground and space Early Warning Network for natural disaster monitoring**
- 13- Establishing very fast communications network by satellite**
- 14- Organizing relief training courses in the risk areas**
- 15- Developing the international cooperation between institutions in using the remote sensing data in monitoring studying and analyzing the natural disaster and its reduction**

Natural Disaster & Environment Management using Remote Sensing Techniques

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Thanks for your attention